

REMARKS

This application has been reviewed in light of the Office Action dated February 28, 2003. Claims 8, 11, 14, and 33-38 are pending in this application with Claim 36 having been indicated as containing allowable subject matter. Claims 33 and 38, which are the independent claims, have been amended, as have Claims 11 and 14, to define more clearly what Applicant regards as the invention. Favorable reconsideration is requested.

The Office Action indicates that the proposed drawing correction dated December 11, 2002 has been approved and that corrected drawings are required in response to this Office Action. In reply, Applicant submits herewith a Letter Transmitting Corrected Drawings incorporating the approved drawing changes.

Claims 33 and 38 have been rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claim 12 of U.S. Patent No. 6,002,287 (Ueno et al.). Claims 33-35, 37, and 38 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,321,528 (Nakamura) in view of U.S. Patent No. 5,640,207 (Rahmouni et al.). Claim 8 was rejected under Section 103(a) as being unpatentable over Nakamura in view of Rahmouni et al., and further in view of U.S. Patent No. 6,215,521 (Surisawa et al.), and Claim 11 was rejected under Section 103(a) as being unpatentable over Nakamura in view of Rahmouni et al., and further in view of U.S. Patent No. 4,780,765 (Hamasaki et al.). Claim 14 was rejected under Section 103(a) as being unpatentable over Nakamura in view of Rahmouni et al., and further in view of Surisawa et al. and Hamasaki et al.

As an initial matter, a telephonic interview was conducted between the Examiner and Applicant's representative on March 17, 2003. The substance of the interview regarded clarification of paragraph 9 of the Office Action, relating to Claims 33

and 38 allegedly not being patentably distinct from Ueno et al., and possible manners of reply. The PTO-413 form attached to the Interview Summary adequately sets forth the details of this conversation. However, as set forth below, Applicant submits that amended independent Claims 33 and 38 are patentably distinct from Ueno et al., and that paragraph 9 of the Office Action is now moot.

Applicant submits that amended independent Claims 33 and 38, together with the remaining dependent claims, are patentably distinct from the cited references, taken separately or in any proper combination, for at least the following reasons.

Claim 33 requires an image sensor including a plurality of photo sensor chips and a correction circuit output chip. The plurality of photo sensor chips are mounted on a single mounting substrate, each photo sensor chip having a plurality of photoelectric conversion circuits, a common output line through which signals from the plurality of photo-electric conversion circuits are outputted, and a photo sensor chip output device which outputs signals from the common output line to outside of the photo sensor chip.

The correction circuit output chip is also mounted on the single mounting substrate and has a noise compensation circuit which compensates for a noise component included in a photo-electric conversion signal read out from the photo sensor chip output device, by using a noise signal read out from the photo sensor chip output device. The correction circuit output chip is arranged commonly to the plurality of photo sensor chips. And, an output terminal of the correction circuit output chip and an output terminal of the single mounting substrate are connected to each other.

Notable features of Claim 33 include not just the individual components recited, but also the particular arrangement of the recited components. That is, the correction circuit output chip and the plurality of photo sensor chips commonly connected

to the correction circuit output chip are all mounted on a single mounting substrate, such that an output terminal of the correction circuit output chip and an output terminal of the single mounting substrate are connected to each other. Support for this feature can be found in reference to Figure 3 and in the specification at least at page 12, lines 1-3, which states that “[t]he amplifier chip 200 has a single output terminal Vout. The output from this terminal Vout is that of the assembly 300.” As shown in Figure 3, the sensor chips 100 and the amplifier chip 200, which is an example of a correction circuit output chip (see Figure 4A), are all on the same single mounting substrate 300. The sensor chips 100 are commonly connected to the amplifier chip 200, and the output of the amplifier chip 200 is connected to the output of the substrate 300, Vout.

Figure 3 also notably shows that the amplifier chip 200 is a chip separate from the sensor chips 100. That is, the correction circuit output chip is not provided within each of the photo sensor chips, as is done in the prior art. And on the other hand, the correction circuit output chip does not contain photoelectric conversion circuits, as the sensor chips do. This saves circuit space by more efficiently using circuit elements. (See page 16, lines 21, to page 17, line 1 of the specification.)

In summary, a separate, single correction chip is provided for the plurality of sensor chips, and all of which are provided on a single substrate such that the output of the correction circuit is the output of the substrate. With this arrangement, circuit size and both inter-chip and intra-chip fixed pattern noise can be reduced. (See page 16, line 19, to page 17, line 26.)

In rejecting Claim 33 under the doctrine of obviousness-type double patenting, the Office Action refers to Claim 12 of Ueno et al. However, Claim 12 of Ueno et al. requires a plurality of integrated circuit chips, each having a plurality of signal

sources, wherein one of the plurality of integrated circuit chips comprises a correct circuit. Applicant understands the Office Action to be stating that the integrated circuits recited in Claim 12 of Ueno et al. are allegedly akin to the photo sensor chips recited in Claim 33 of the present application. Therefore, Claim 12 of Ueno et al. would require that the correct circuit be a part of an integrated circuit, or photo sensor chip, that contains a plurality of signal sources. (As a reference, see Figure 1 of Ueno et al. which shows the correct circuit 6 as part of a larger chip 1, 2, 3 having signal sources 4.) In contrast, Claim 33 of the present invention requires a correction circuit output *chip*, not a correction circuit contained within one of the photo sensor chips. As discussed above, this requirement assists in the reduction of circuit size by more efficiently utilizing circuit elements. A key point of the invention is not to have a correction circuit as part of the design of a photo sensor chip, thereby saving space. Therefore, Applicant submits that Claim 12 of Ueno et al. does not teach or suggest the correction circuit output chip of Claim 33 of the present application.

Further, Applicant submits that since Claim 12 of Ueno et al. does not teach or suggest such a correction circuit output chip, it also does not teach or suggest that an output terminal of the correction circuit output chip is connected to an output terminal of the single mounting substrate, as required by Claim 33 of the present application.

In rejecting Claim 33 under Section 103(a), the Office Action first refers to Nakamura. The Office Action states, and Applicant agrees, that "Nakamura is silent with regard to including the amplifier circuit on the base with the sensor chips." (Please refer to the bottom of page 7 of the Office Action.) Similarly, Applicant submits that Nakamura is also silent with regard to having a correction circuit output chip on the same substrate as

the plurality of photo sensor chips, wherein the output terminal of the correction circuit output chip is connected to the output terminal of the substrate, as required by Claim 33.

To supplement the lacking disclosure of Nakamura, the Office Action then points to Rahmouni et al., stating that Rahmouni et al. discloses a printed circuit board, or PCB, that contains a charge-coupled photo device, or CCPD, and certain signal conditioning and processing circuitry. (Please refer to the bottom of page 7 of the Office Action, which cites column 5, lines 10-15 of Rahmouni et al.) However, if it is the PCB that the Office Action refers to as disclosing a single substrate according to Claim 33, then Rahmouni et al. appears to be silent with regard to disclosing that an output terminal of the “certain signal conditioning and processing circuitry” is connected to an output terminal of the PCB. Additionally, Applicant does not believe that the “certain signal conditioning and processing circuitry” of Rahmouni et al. is disclosed to have the function of the correction circuit output chip of Claim 33.

For these reasons, Applicant submits that neither Ueno et al., Nakamura, nor Rahmouni et al., either alone or in any proper combination, teach or suggest to a person having ordinary skill in the relevant art that the correction circuit output chip and the plurality of photo sensor chips commonly connected to the correction circuit output chip are all mounted on a single mounting substrate, such that an output terminal of the correction circuit output chip and an output terminal of the single mounting substrate are connected to each other, as required by Claim 33. Accordingly, Applicant submits that Claim 33 is patentable over these references, taken separately or in any proper combination, and respectfully requests withdrawal of the corresponding double patenting and Section 103(a) rejections.

Independent Claim 38 is a method claim that corresponds to apparatus Claim 33, and is believed to be patentable for at least the same reasons as discussed above in connection with Claim 33. Therefore, withdrawal of the double patenting and Section 103(a) rejections of Claim 38 is also respectfully requested.

A review of the other art of record has failed to reveal anything that, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as applied against the independent claims herein. Therefore, those claims are respectfully submitted to be patentable over the art of record.

The other rejected claims in this application depend from Claim 33 discussed above and, therefore, are submitted to be patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, individual reconsideration of the patentability of each claim on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and the allowance of the present application.

Applicant's undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,


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